

Rail profile and presentation device produced therewith

Field of the invention

The invention relates to a rail profile which is to be fastened to a supporting structure and has a passage extending from the front side into the interior of the rail. The rail profile has arranged in it a conductor rail with current-carrying wires which are guided therein and are accessible from the passage for electrical tapping-off by means of an adaptor which can be plugged in. The adaptor which can be plugged in and displaced at any desired position along the rail profile is provided for supplying current to consumers which can be connected, in particular lights.

In an expanded embodiment of the rail profile, supporting arms can be inserted into the passage and serve for the direct hanging of objects or for securing, for example, supports in the form of bars, hangers, hooks or plates which receive the objects which are to be presented and/or stored. Suitable objects are, for example, goods which are to be presented, exhibits and articles of decoration or commercial or private sector articles to be stored. Supporting structures may be, for example, sales stands, rear walls, middle walls or dividing walls. In order to construct a more complex arrangement, for example for a presentation wall in a commercial installation, both variants of the rail profiles can be used next to each other. The rail profiles are advantageously produced as aluminum extruded profiles which are cut to the required length for a specific use.

Prior art

DE 201 00 181 U1 discloses a profile which is provided for the vertical arrangement and for the hooking-in of conventional brackets. Walls which in between form a channel with a vertically continuous entry slot taper toward the front side of the profile. A slotted grid for receiving the hook-in lugs of hooked-in brackets lies in the region of the rear side of the profile. This profile does not have an internal supply of current, and so the function is restricted solely to the securing of shelf elements.

WO 03/070 060 A1 describes a rail profile into which supports for hanging or depositing objects are inserted. This rail profile is intended to be fastened horizontally to

a supporting structure; it has a passage extending horizontally from a front entry into the rail profile. It has arranged within it a conductor rail which is supplied via a power supply and has conductors which are accessible from the passage for electrical tapping-off in order to supply a consumer, which can be connected via a supply line. The rail profile shown therein is provided only for horizontal installation and therefore does not permit any positioning of supports for goods at a selectable height.

EP 0 007 071 A1 has a holding rail which is preferably to be arranged vertically as subject matter and has a front wall provided with slots. For the removable hanging of furniture elements and panels, there are hook-in lugs thereon for engagement in slots selected according to the desired hanging height. Also disclosed is a contact device which, after plugging through the slots, produces an electrical connection between conductor rails, which are placed in the interior of the holding rail and extend in the longitudinal direction, and a consumer, which is situated outside the holding rail. The disadvantage here is that the current cannot be tapped off at any desired point along the entire axial extent, since the contact device can be positioned in each case only in one slot. The slotted grid which is situated at the front and of which most of the slots have to remain unoccupied, even at maximum load, is visually conspicuous, and given its relatively rough structure, is therefore not suitable for all aesthetic requirements, such as, for example, for presenting delicate lingerie.

Object of the invention

In view of the imperfections of previous rail profiles for the field of use here, the invention is based on the object of providing a current-conducting rail profile with a claim to being highly creative, at which current can be tapped over the entire axial extent by means of an adaptor which can be plugged in and displaced longitudinally.

A further object is to make it possible, in a constructively expanded variant of the rail profile, in addition to the delivery of current at the same time to hook in conventional brackets in order to secure variously configured supports for goods. Using

rail profiles of both variants, more complex presentation devices are to be able to be constructed and fitted in accordance with individual requirements.

Overview of the invention

5 The rail profile intended for fastening to a supporting structure and for the construction of presentation devices is provided in a simpler first and an expanded second variant. The rail profile has arranged within it a conductor rail which is supplied via a power supply and has conductors partially embedded in an insulation profile. The rail profile has a passage which extends from the front entry, runs continuously at
10 least substantially along the rail profile, ends at a back strut and permits the engagement of an adaptor for the conductor rail to the conductors – in a freely selectable position in order to supply a consumer, which can be connected via a supply line. The rail profile is provided for vertical installation in the supporting structure when installed, in principle only the passage which emerges through a
15 groove in the supporting structure being visible from the front side of the supporting structure.

The features below relate to special embodiments of the rail profile which apply first of all for the first and the second variant together: the entry into the gap-
20 shaped passage is flanked by a left and a right access strut which extends in each case as far as a left or right wing strip which branch off at an angle and are intended for placing on the rear side of the supporting structure. Each access strut is continued behind the associated wing strip in the direction of the back struts as a left or right flank strut. One of the flank struts is offset to the outside, thus produ-
25 cing space for accommodating the conductor rail. The access struts are provided toward the front side of the supporting structure, at their free ends, in each case with a bent-over portion as edge protection and edge border. There are holes for fastening elements – primarily screws – which are screwed into the rear side of the supporting structure, in the wing strips.

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The space for accommodating the conductor rail is formed from two adjacent groove profiles which are separated from each other by a central web which branches off from the adjacent flank strut into the interior of the rail profile. This

clearance has profilings for accommodating the conductor rail, on which complementary outer contours of the insulation profile are supported. On the back strut there is an inwardly facing, raised molding as electrical grounding contact for the engaging adaptor. The conductor rail comprises the insulation profile, which in principle has a meandering cross section, and current-carrying wires which are accommodated in wire grooves and can be tapped off at least virtually over the entire axial extent of the current-carrying wires via groove-shaped access points. When inserted, the insulation profile comes to lie in the two groove profiles in a manner surrounding the central web, as a result of which the access points to the current-carrying wires, which are set back in relation to the passage, in principle open perpendicularly to the passage. The two access points open on one side of the insulation profile while the two current-carrying wires are embedded on the other side of the insulation profile. Grooves are mounted on both sides within and upstream of the back strut, for engagement of a lock of the adaptor. The grooves are formed by the back strut and by strut sections bounding the grooves laterally and toward the mouth of the passage.

The rail profile is advantageously produced as an aluminum extruded profile while the conductor rail is preferably produced as a plastic extruded profile.

The special characteristics of the rail profile of the second variant comprise a grid of grooves for accommodating hook-in lugs of hooked-in brackets being provided in the back strut. The brackets can be hooked in from the front side of the supporting structure, in a manner protruding through the passage. Two extensions which are spaced apart from each other run from the back strut in the opposite direction to the mouth of the passage and in between form a back groove into which the hook-in lugs of hooked-in brackets protrude. An outwardly pointing outer wing is attached to each extension, as a result of which the left and right wing strip and the left and right outer wing in each case lie parallel to one another. In the outer wings there are holes for fastening elements – primarily screws – which are screwed into a supporting framework or a building part to mount the rail profile.

In a simplified manner, the rail profile of the second variant can be fastened by

screwing the wing strips on the rear side of the panel. As an alternative, holding clips are fixed opposite one another in pairs on the rear side of a supporting structure formed by a panel. A holding clip comprises a vertical limb, placed on the rear side, and tongues which are angled from the upper and lower end of the vertical limb and, bent at right angles to the rear side of the panel, leave a gap, corresponding to the material thickness of the wing strips. The tongues are arranged at the spacing of systematic recesses present on the wing strips, so that a panel provided with holding clips can be hung after the tongues are pushed through the recesses and lowered behind the wing strips. The holding clips are preferably attached on the rear side of the panel by means of screws.

The adaptor which is equally to be used for the first and the second variant of the rail profile first of all comprises a rotatable spindle and pivotable contact lugs sitting thereon for current collection from the current-carrying wires. A grounding contact of the adaptor is intended for placing on the molding. A locking element which can be displaced with the rotation of the spindle engages in the locked state – in this case the contact lugs are on the current-carrying wires – in the grooves on the rail profile, so that the adaptor can only be pulled out or pushed into the passage if the tapping off of current is interrupted or has not yet been produced – the contact lugs are then removed from the current-carrying wires.

A complex presentation device erected using the rail profiles of the first and second variant has the following characteristics: a multiplicity of vertically arranged rail profiles is inserted into a supporting structure which can be assembled from a plurality of panels which stand in one or different vertical planes. The rail profiles are fitted in a defined grid from each other, with rail profiles of the second variant – with the additional grooves for the hooking-in of brackets – and optionally at least one rail profile of the first variant – without such grooves, i.e. only for supplying current – being used. It is also possible as an alternative for there to be attached to a bracket, for example:

- a supporting arm protruding into the room, for the direct hanging of objects, for example items of clothing on hangers; or

- a supporting arm protruding into the room, for the securing of a transversely running front bar which is supported by at least one further such supporting arm whose bracket engages in an adjacent rail profile; or
- a supporting arm protruding into the room, for securing a shelf which is supported by at least one further such supporting arm whose bracket engages in an adjacent rail profile; or
- a transverse support arranged in the vicinity of the front side, for securing a slip-on arm protruding into the room, the transverse support being supported by at least one further bracket which is hooked into an adjacent rail profile.

At least one electrical consumer, for example a light fitted under a shelf, is supplied by the rail profile of the first variant, which only conducts current, via an adaptor which can be plugged into the rail profile in a freely selectable position.

Brief description of the appended drawings

In the drawings:

figure 1A shows two panel elements which are joined to one another in a wall plane with rail profiles of the first variant, which only conducts current, and of the second variant which can also be used as a securing means, with hooked-in supporting arms which support a shelf, a transverse bar and a slip-on arm, in a perspective front view;

figure 1B shows the construction according to figure 1A, in a side view;

figure 1C shows the enlarged detail X1 from figure 1B;

figure 2A shows the upper end of a rail profile of the first variant, in a perspective view;

figure 2B shows an entire rail profile of the first variant according to figure 2A, in a front view from the front;

figure 2C shows a horizontal section on the line A–A in figure 2B;

figure 3A shows the upper end of a conductor rail, in a perspective view;

figure 3B shows a horizontal section on the line B–B in figure 3A;

figure 3C shows the conductor rail according to figure 3A inserted into the rail profile of the first variant according to figure 2A, in a perspective view;

- figure 4A shows a rail profile of the second variant, in a perspective view;
figure 4B shows the rail profile of the second variant according to figure 4A, in a front view from the front;
5 figure 4C shows a horizontal section on the line C–C in figure 4B;
- figure 5A shows the conductor rail according to figure 3A inserted into the rail profile of the second variant according to figure 4A, in a perspective view;
10 figure 5B shows a horizontal section on the line D–D in figure 5A;
- figure 6A shows a rail profile of the first variant with a conductor rail according to figure 3C inserted into a panel element, with an adaptor plugged in, in a perspective front view;
15 figure 6B shows the arrangement according to figure 6A, in a perspective rear view;
figure 6C shows the enlarged detail X2 from figure 6A;
- figure 7A shows the arrangement according to figure 6A, in a side view;
20 figure 7B shows an enlarged horizontal section on the line E–E in figure 7A;
- figure 8A shows a rail profile of the second variant with a conductor rail according to figure 5A inserted into a panel element, with an adaptor plugged in, in a perspective front view;
25 figure 8B shows the arrangement according to figure 8A, with holding clips, in a perspective rear view;
figure 8C shows the arrangement according to figure 8A with a supporting arm hooked in and a shelf supported thereby, in a perspective front view;
- 30 figure 9A shows the arrangement according to figure 8A, in a side view;
figure 9B shows the arrangement according to figure 8C, with an enlarged sectional view of the hooked-in supporting arm, but without a shelf, in a side view;
figure 9C shows a horizontal section on the line F–F in figure 9A, over the
35 course of the rail profile of the second variant;

figure 9D shows a horizontal section on the line G—G in figure 9A, closely above the plugged in adaptor; and

figure 9E shows a horizontal section on the line H—H in figure 9A, centrally through the plugged in adaptor.

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Exemplary embodiment

The detailed description of an exemplary embodiment for both variants of the rail profile according to the invention in various ways of fitting it and installed in a complex presentation device follows below.

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The following statement applies to the whole of the rest of the description. If reference numbers are contained in a figure for the purpose of graphical unambiguity, but are not explained in the directly associated text of the description, then reference is made to where they are explained in the preceding or following descriptions of the figures. In the interests of clarity, the repeated designation of components in further figures is generally omitted if it can be graphically unambiguously seen that these involve "repeating" components.

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Figures 1A to 1C

Four rail profiles 2 of the second variant and two rail profiles 1 of the first variant are inserted vertically, parallel to one another, into two panels 9,9, which are joined together to form a rectangular, vertical wall, which rail profiles, in a manner advantageous creatively, extend symmetrically with respect to the horizontal center line of the wall over a large part of the height of the wall. The fastening of the rail profiles 1,2 takes place from the rear side 91 (see in particular figures 6B and 8B). Brackets 82, to which are attached supporting arms 8 which protrude away from the front sides 90 into the room, are inserted into the rail profiles 2 of the second variant. The shelf 7 and the front bar 70 rest in each case on a horizontal series of at least two supporting arms 8 which are inserted in each case into mutually adjacent rail profiles 2 of the second variant. The transverse support 85, which extends horizontally and in the vicinity of the front side 90 of the panel element 9 between a pair of brackets 82,82, serves for the hooking-in of a dis-

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placeable slip-on arm **71** which can be positioned as desired along the transverse support **85**.

The rear sides of the rail profiles **1,2** protrude outward from the rear side **91** of the panel **9**. From the front side **90** of the panel **9**, the supporting arms **8** are plugged into the rail profile **2** of the second variant with the aid of upper and lower hook-in lugs **83,84** attached to the brackets **82**. The supporting arms **8**, which are intended for supporting the front bar **70**, have, at their respective free ends of the bar parts **80**, front portions **81** which comprise upwardly opening forks and engage under the front bar **70** over more than half of its circumference, with the result that the front bar **70** is upwardly secured. The shelves **7** are connected to the supporting arms **8** by means of tongue-and-groove connections. Below the central shelf **7** and above the upper supporting arm **8**, a respective adaptor **4** is plugged into the rail profile **2** of the second variant. A supply line **46,78** runs from the lower adaptor **4** to the light **79**.

Figures 2A to 2C

The rail profile **1** of the first variant has a constant cross section over its entire length. The left access strut **12** tapering to the front side of the profile and the right access strut **13** form in between an open passage **10**. At the entry into the passage **10**, the access struts **12,13** are angled to form bent-over portions **120,130** which point in opposite directions and serve as edge protection and edge border. The front surfaces of the bent-over portions **120,130**, against which the housing **40** of a displaceable adaptor **4** plugged into the rail profile **1** butts (see figure 7B) lie in a common plane.

The left access strut **12** merges to the left into a left wing strip **14**. A left flank strut **121** is attached vertically approximately in the center of the wing strip **14**, thus resulting in a T-shaped cross section, and the left wing strip **14** with the left flank strut **121** forming an adjoining space which branches off vertically from the passage **10** and is bounded to the rear by a left transverse strip **122**. In the interior of the adjoining space, a central web **18** rises from the inside of the left flank strut **121** and divides the adjoining space into a first groove profile **16** and a second

groove profile **17**. The two groove profiles **16,17** have mutually mirror-inverted profilings **160,170** on which the complementary profile of a conductor rail **3** is supported. The central web **18** supports the conductor rail **3** and therefore provides an additional means of securing against deformation and ultimately a short circuit between the current-carrying wires **35,36** (see figure 3C). The left transverse strut **122** comes together at right angles with a left back strut **123** which, together with the left end of the back strut **11** and a lug of the profiling **170** that is situated parallel to the back strut **11**, bounds a left groove **111**. A right wing strip **15** which lies in a plane with the left wing strip **14** extends to the right perpendicularly to the right access strut **13**. The holes **140,150** in the wing strips **14,15** serve to fasten the rail profile **1** on the rear side **91** of the panel **9**. The right access strut **13** continues behind the right wing strip **15** as right flank strut **131** which merges shortly before reaching the back strut **11** to the right into a right transverse strut **132**. The right transverse strut **132** bends off into a right back strut **133** and, together with the latter and the right end of the back strut **11**, forms a right groove **112**. A molding **110** rises centrally from the inside of the back strut **11** and is intended for tapping off a grounding contact **44** for the adaptor **4** (see figure 7B).

Figures 3A to 3C

The conductor rail **3** comprises an insulation profile **30**, a first current-carrying wire **35** guided in a first wire groove **33** and a second current-carrying wire **36** guided in a second wire groove **34**. The two current-carrying wires **35,36** lie in a common plane running parallel to the access struts **12,13** and can be tapped off via access points **31,32** over the entire axial extent of the conductor rail **3**. The insulation profile **30** has in principle an M-shaped or meandering cross section. In each case one M limb of the insulation profile **30** is arranged in each case in one of the groove profiles **16,17** branching off from the passage **10**, and the central web **18** is surrounded by that central part of the insulation profile **30** which is open to the flank strut **121** in the inserted state. The insulation profile **30** of the conductor rail **3** has outer contours **37** which fit into the complementary inner contours **160,170** on the groove profiles **16,17**. The access points **31,32** open perpendicularly to the passage **10**. The wire grooves **33,34** and the current-carrying wires, **35,36**, which

are guided therein and are preferably round in cross section, are situated in each case in the tips of the M-limbs.

Figures 4A to 5B

5 The rail profile **2** of the second variant with the passage **20** is an expansion of the rail profile **1** of the first variant and therefore has numerous common features. The back strut **21** with the molding **210** and the grooves **211,212** situated on both sides thereof, the left and right access struts **22,23** with the front bent-over portions **220,230**, the left and right wing strips **24,25**, the two groove profiles **26, 27**
10 with the inner profilings **260,270** and the dividing central web **28** are once again present. There is likewise the left and right flank struts **221,231** and the right transverse strut **232** and the right back strut **233**. In the same manner as in the case of the rail profile **1** of the first variant, the identical conductor rail **3** with the insulation profile **30**, the two access points **31,32**, wire grooves **33,34** and current-
15 carrying wires **35,36** is also inserted into the rail profile **2** of the second variant.

Situated on the longitudinal center line of the back strut **21** is a grid of grooves **213** into which the hook-in lugs **83,84** of the brackets **82**, which lugs are brought up through the passage **20**, can be hooked. A respective extension **224,234**
20 extends vertically to the rear on both sides of the back strut **21**. The back strut **21** and the two extensions **224,234** form a U-shaped back groove **29** which provides space for the hook-in lugs **83,84** hooked into the grooves **213**. The left extension **224** merges vertically to the left into a left outer wing **225** and the right extension **234** merges to the right into a right outer wing **235**. At a systematic spacing in the
25 wing strips **24,25** there are respective recesses **240,250** which are open toward the outer edge. The outer wings **225,235** have holes **226,236** for fastening the rail profile **2**, for example, to a rear wall of a building or to a support.

Figures 6A to 6C

30 In order to insert the rail profile **1** of the first variant into the panel **9**, the access struts **12,13** are guided from the rear side **91** of the panel **9** through a groove **92** as far as the wing strips **14,15**. The groove **92** is provided in identical length to the rail profile **1** and its width is intended to correspond with as little play as possible

to the span between the outer ends of the two bent-over portions **120,130**. The wing strips **14,15** rest on the rear side **91** of the panel **9** and are fastened by means of screws **149,159** protruding through the holes **140,150** (also see figure 7B). The bent-over portions **120,130** advantageously protrude forwards somewhat beyond the plane of the front side **90** of the panel **9**. The conductor rail **3** is situated in principle behind the panel **9** and therefore permits an easily accessible power supply. The adaptor **4** can be pushed to some extent together with the back and front plates **400,401** belonging to the housing **40** into the passage **10** from the front side **90** of the panel **9**. The housing **40** has angled stops on both sides which limit the push-in depth and guide the adaptor **4** in a laterally stable manner during displacement along the rail profile **1**.

Figures 7A and 7B

The adaptor **4** is described as an accessory subject matter of WO 03/070 060 A1 and is therefore described there in detail, with the result that its basic handling is sufficient here. The adaptor **4** essentially comprises a housing **40** with a back plate **400**, a front plate **401** and a rotary knob **41** which is accessible to the user and is connected to a spindle **410** extending for the most part within the housing **40**. Within the spindle **410**, two conductors of different length run axially parallel to each other and, at their rear ends, are bent over at right angles to form a front contact lug **42** and to form a rear contact lug **43** and protrude radially out of the spindle **410**. A latch **45** is fastened transversely at the rear end of the spindle **410**, which end protrudes outward out of the housing **40**. Displacement of the rotary knob **41** causes the spindle **410** to rotate and the contact lugs **42,43** connected to it and the latch **45** to pivot. When the adaptor **4** is pushed into the passage **10** of the rail profile **1**, the contact lugs **42,43** and the latch **45** have in principle to be aligned axially to the rail profile **1** and conductor rail **3**, for example have to point upward. In this position, the contact lugs **42,43** are completely pivoted into the housing **40**. After the adaptor **4** has been completely pushed in, the latch **45** bears against the molding **110**. Then, by displacement of the rotary knob **41**, the contact lugs **42,43** are rotated through 90° out of slots in the housing **40** and in the process pivot into the groove profiles **16,17**, the contact lugs **42,43** finally being situated horizontally in the groove profiles **16,17** and bearing against the current-

carrying wires **35,36**. As a consequence of the rotation, the outer ends of the latch **45** engage in the left and right grooves **111,112**. The latch **45** therefore prevents the adaptor **4** from being pulled out of the rail profile **1** and the grounding contact **44**, which bears against the molding **110**, from being interrupted when current is being tapped off.

Figures 8A to 9E

In this sequence of figures, the rail profile **2** of the second variant is inserted into a panel **9** and an adaptor **4** inserted into the passage **20** and a bracket **82** hooked in through the passage **20** are illustrated. At the same time, the releasable fastening of the panel **9** to the rail profile **2** by the holding clips **5** attached on the rear side is illustrated. In the hooked-in state, the brackets **82**, which can continue in a manner directed into the room as a bar part **80** and forms a supporting arm **8**, protrudes through the passage **20**. After the inserted bracket **82** is lowered, the two downwardly directed hook-in lugs **83,84** engage behind the wall edge in the back strut **21** under the grooves **213** selected at the desired hook-in height. The protruding hook-in lugs **83,84** find space in the back groove **29** formed between the two extensions **224,234**.

Holding clips **5** are fastened lying opposite each other in pairs on the rear side **91** of a supporting structure **9** formed by a panel. The individual holding clip **5** comprises a vertical limb **50**, which is placed directly on the rear side **91**, and tongues **51** which are angled from the upper and lower end of the vertical limb **50** and, bent at right angles to the rear side **91**, leave a gap, corresponding to the material thickness of the wing strips **24,25**. The tongues **51** of a pair of holding clips **5** are directed towards each other and are at a vertical distance in a manner complementary to the recesses **240,250** in the wing strips **24,25**. The panel **9** provided with holding clips **5** can therefore be hung after the tongues **51** are pushed through the recesses **240,250** and lowered behind the wing strips **24,25**. The holding clips **5** are fastened on the rear side **91** of the panel **9** by means of screws **59**. In a simplified form, the rail profile **2** situated with its access struts **22, 23** in the groove **92** present in the panel **9** could also be fastened, instead of by the

holding clips **5**, by screwing the wing strips **24,25** on the rear side **91** of the panel **9**.

5 The adaptor **4** previously used in the case of the rail profile **1** of the first variant was likewise used for the rail profile **2** of the second variant. The access of the adaptor **4** to the conductor rail **3** is identical in both rail profiles **1,2**, and so the explanation to figure 7 applies analogously to figures 9D and 9E.